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TEACHER CHARACTERISTICS, CLASSROOM BEHAVIOR, AND GROWTH IN PUPIL CREATIVITY.

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EXPLORATION OF RELATIONSHIPS AMONG TEACHER CHARACTERISTICS, THEIR CLASSROOM BEHAVIOR, AND GROWTH IN PUPIL CREATIVITY USED THREE MEASURES--(1) A BATTERY OF TESTS ADMINISTERED TO PUPILS IN 30 6TH-GRADE CLASSES (MEASURING IDEATIONAL FLUENCY, SPONTANEOUS FLEXIBILITY, REDEFINITION, AND SENSITIVITY), (2) OBSERVATION OF THE CLASSROOM BEHAVIORS OF THESE TEACHERS BY TRAINED OBSERVERS USING AN OBSERVATION SCHEDULE MEASURING CLASSROOM CLIMATE, TEACHER-LEARNING STRUCTURE, AND SPECIFIC STRUCTURING FOR CREATIVITY, AND (3) RESPONSES BY 20 OF THESE TEACHERS TO A CHARACTERISTICS SCHEDULE SCORED BY RESOURCEFULNESS, VIEWPOINT, ORGANIZATION, STABILITY, AND INVOLVEMENT. FINDINGS WERE--(1) IMAGINATIVE OR RESOURCEFUL TEACHERS USE POSITIVE MOTIVATION TO ENCOURAGE PUPIL RESPONSES AND TO INCREASE PUPILS' ABILITY TO GIVE UNUSUAL USES FOR COMMON OBJECTS, (2) PUPIL-CENTERED TEACHERS APPEAR TO ADAPT TO INDIVIDUAL DIFFERENCES TO VARY MATERIALS AND ACTIVITIES, AND TO OBTAIN IMPROVED FLEXIBILITY IN STUDENT THINKING, AND (3) HIGHLY ORGANIZED TEACHERS APPEAR TO OBTAIN PUPIL INTEREST AND TO MAINTAIN GOOD PUPIL-TEACHER RELATIONSHIPS, BUT THEY DO APPEAR TO RESTRICT PUPIL FLUENCY OF IDEAS. THE AUTHORS CONCLUDED THAT TEACHER CHARACTERISTICS AND BEHAVIOR INCREASE CREATIVE BEHAVIOR. THIS PAPER WAS PRESENTED AT THE AMERICAN EDUCATION RESEARCH ASSOCIATION CONFERENCE (FEBRUARY 1967). (HA)

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Teacher Characteristics, Classroom Behavior, and Growth in Pupil Creativity

The research presented in this paper is an offshoot of two studies, each concerned with different aspects of teacher behavior. One of the studies, that by Denny[1], focuses on time sample observations of teacher classroom behaviorsand their relationship to pupil growth in creativity. The other study, by Turner[2], focuses on the assessment of multiple teacher characteristics, of which in this paper, only personal-social characteristics are of concern. The laison between the studies developed in order to explore how measured teacher characteristics might be reflected in the observed classroom behavior of teachers and in pupil growth in creativity.

Procedure. In October 1965, and again in April 1966 Denny administered to 30 sixth grade classes in the Bloomington, Indiana area, a battery of creativity tests adapted to sixth grade level from those designed by Guilford and others.[3] This battery covered four measures of creativity:

1. Ideational Fluency - the ability to write out a large number of ideas of what might happen if the common situations we encounter were to change, for example, what would be the result if people no longer wanted or needed sleep? (r_{xx}=.73)
2. Spontaneous Flexibility - ability to think of and write down different or

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1. Denny, David A., "A Preliminary Analysis of an Observation Schedule Designed to Identify the Teacher Classroom Variables Which Facilitate Pupil Growth." Final Report USOE, CRP No. 6-8235-2-12-1, Indiana University, Bloomington, Ind., 1966.
2. Turner, Richard L., "Differential Association of Elementary School Teacher Characteristics With School System Types" USOE, CRP 5-0345-2-12-1. (In process, final report will be available after July 1, 1968.)
3. Guilford, J.P., Merrifield, P.R., and Cox, Anna B.; "Creative Thinking in Children at the Junior High School Level," Report of the Psychological Laboratory, No. 26, 1-35, USC, Los Angeles, 1961.

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out of the ordinary uses for common things: for example, what can one do with a newspaper other than read it? (r_{xx}=.77)

3. Redefinition - ability to recognize how a common object might be altered or transformed to give it new functions or uses; for example, would a fountain pen, an onion, a pocket watch, a light bulb or a bowling ball be best for starting a fire? This test does not picture the object, it gives only the word for the object, hence it appears to involve well developed verbal concepts as well as divergent thinking. (r_{xx}=.50)
4. Sensitivity - ability to identify problems involved in the structure, use or operation of an object; for example, what problems can one associate with the word "tree?" (r_{xx}=.79)

To obtain a measure of growth from these creativity tests, the post-test scores on each were adjusted by analysis of covariance for pre-test scores, and for I.Q. For purposes of statistical analysis the mean adjusted post-test score on each creativity test for each class was used as a separate criterion measure.

In February-March 1966, each participating teacher's self-contained classroom was observed three times for 30 to 40 minutes on random occasions by a team of three trained observers working independently using the Denny-Rusch-Ives Classroom Creativity Observation Schedule. The average observation score for each classroom, then, was derived from a total of nine independent scores from three visits. There are ten items on the Schedule. The ten items are described on your hand-out in attachment 1. These ten items fall conceptually into three broad groups, these groups however, do not represent empirically derived factors - they are only conceptual.

Group 1. Classroom Climate: encompassing motivational climate, pupil interest, pupil-teacher and pupil-pupil relationships.

Group 2. Teaching-Learning Structure: encompassing pupil initiative in controlling instruction, adaptation to individual differences, variation in materials and activities, and teacher approach.

Group 3. Specific Structuring for Creativity: encompassing teacher encouragement of divergent thinking, and of unusual responses.

The method of making the observation was quite similar to that developed by Medley and Mitzel in the OScAR. The ten items observed appear in different parts of the schedule and were dealt with during time samples of varying lengths. For example, such items as Motivational Climate, Encouraging Divergent Thinking, and Pupil Initiative were rated on a five point scale at the end of each five minute period. On the other hand, Pupil Interest, Teacher-Pupil Relationship, Pupil-Pupil Relationship and Teacher Approach were tallied when specified behaviors were observed to occur during each ten minute interval. Again, Variation in Activities and Materials was indexed by tallying only once each type of activity or material used during the entire observation. Because the system of recording varies across items, the way in which the items were quantified also varies. In some instances item scores were derived by summating weights as defined by a code; in other instances the quantification was accomplished by summating tallies for the item. The criterion scores after quantification from the observation schedule were obtained by taking the mean values for each item across the three observations.

At the end of April, after the observations were made and the creativity post-tests were administered, each teacher was mailed a reconstructed form of the Teacher Characteristics Schedule. This schedule contains 118 items from Ryan's original Teacher Characteristics Schedule, Form E54, plus 32 new items. At present this schedule is scored on five scales:

Resourcefulness - An estimate of the extent to which the teacher engages in imaginative or resourceful responding in a social context. This scale was derived largely from items in Ryan's Factor Zco, stimulating, imaginative behavior, although some items from Factor Xco, friendly, understanding behavior were included. (r_{xx}=.66)

Viewpoint - An estimate of the degree to which a teacher is pupil-centered ("permissive") as opposed to teacher-centered ("traditional"). Higher scores indicate greater degree of teacher centeredness. This scale was derived from Ryan's Factor B, pupil versus subject centered viewpoint with the addition of 15 new items on the locus of authority in the classroom. (r_{xx}=.58)

Organization - An estimate of the extent to which the teacher is systematic and organized. The higher scores on this scale suggest a high level of classroom organization. This scale was developed primarily from Ryan's Factor Yco, business-like, responsible behavior, with some correlative items from Factor Q, attitude toward school staff. (r_{xx}=.60)

Stability - An estimate of the extent to which the teacher has a favorable personal-social orientation. High scores on this scale suggest a favorable attitude toward students and a favorable social-emotional orientation on the part of the teacher. This scale was developed from Ryan's Factor R, attitude toward pupils, and Factor S, emotional adjustment. (r_{xx}=.78)

Involvement - An estimate of the degree to which the teacher identifies with, or is involved in his work. The higher scores indicate greater involvement. (This scale has subsequently been reconstructed.)[4]

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4. With respect to the relationships among these characteristics; Resourcefulness, Viewpoint, and Involvement are uncorrelated. Stability and Organization correlate with each other, but are uncorrelated with the other three characteristics.

Of the 30 teachers to whom the schedule was sent, 20 returned a complete schedule. The observation schedule scores and the pupil creativity scores of the 20 returnees were randomly distributed among the total group suggesting that there was no selective bias in the return group. The analysis of the data does, however, reflect the fact that different numbers of teachers were involved in different aspects of the study. Relationships between observed teacher behavior and pupil creativity gain were obtained by product moment correlations utilizing 30 observations. Relationships between teacher characteristics, classroom behavior and pupil creativity gain were obtained by analysis of variance using 20 observations. In all analyses, each classroom counted as one degree of freedom.

Results and Interpretation. In looking at the results, we want to focus primarily on the associations between the characteristics of the teachers, their classroom behavior, and the behavior changes of their pupils. These relationships rest on data from 20 classrooms and teachers. Supplementary to the interpretation of these results arethe data reported by Denny on the relationships between teacher behavior and pupil behavior changes for 30 classrooms. If you will now observe Table 1 in the hand out, you may note that the associations between teacher characteristics, teacher behaviors, and pupil creativity change for 20 classrooms are given at the top of the Table. You should read down columns to obtain the associations. The supplementary data for 30 classrooms appears at the bottom of this Table. You should read up the columns at the bottom of the Table to obtain the correlations between teacher behaviors and pupil creativity changes in these classrooms.

Beginning at the top left side of the Table and reading down one may note that Resourcefulness as a teacher characteristic appears to be reflected in those teacher

behaviors, namely, Motivational Climate and Encouraging Unusual Responses, which involve positive reinforcement of both typical and unusual pupil responses. Resourcefulness is also related to a classroom situation in which pupil to pupil relationships of a positive reinforcing nature exist. Collaterally, this characteristic appears to be linked to increased pupil ability to recognize unusual uses for common objects, i.e. Redefinition. Moving now to the bottom of the Table and reading up the column above Redefinition, one may observe that in the total sample of teachers, Motivational Climate, Pupil-Pupil and Teacher-Pupil Relationships are positively associated with Redefinition gain. Encouraging Unusual Pupil Responses, however, was not directly associated with Redefinition gain, probably because the reliability of the redefinition test was .50, too low to obtain a relationship. If we now go to the last column at the top of the Table, we may note that Involvement as a teacher characteristic holds a weak positive relationship to Redefinition gain, but a strong inverse relationship to Pupil Initiative. This relationship distinctly suggests that the more involved with teaching the teacher is, the more he seeks to control instruction. One might point out in this connection that the General Structuring aspects of observed teacher behavior appears to be associated with two similar teacher characteristics, Viewpoint, and Involvement, with high scores on each being generally linked to apparently dominant behaviors.

Keeping these various relationships in mind, we may form a general picture of the characteristics and classroom behavior of the teacher who appears to obtain the better pupil performance in recognizing unusual uses for common objects, namely, she is relatively imaginative or resourceful and has slightly above average involvement in her work. She is generally high on positive reinforcement in the classroom and distinctly reinforces unusual pupil responses contributing thereby

to a positive pupil-pupil climate; she is attentive to pupils and encourages opinions, at the same time however, she appears to retain rather full control over the course of instruction.

Moving at this point to the second column at the top of the Table, we may observe that Organization as a teacher characteristic is slightly associated with motivational climate, moderately associated with pupil interest, and relatively strongly associated with teacher-pupil relationships. Organization is, however, inversely linked to pupil gain in Fluency. Reading the second column at the bottom of the Table it is notable that Fluency is negatively related to teacher-pupil relationships. The situation here seems clear, the well-organized, business-like teacher seems to establish a favorable classroom climate, but one which suppresses fluency of ideas. The classroom apparently looks good to the observer, but perhaps it is somewhat over-organized from the viewpoint of encouraging a free-flow of pupil ideas. This is not to deny the possibility that the well-organized teacher may obtain quite good results on standard achievement tests or other tests which reward convergent thinking.

Observing column 3 at the top of the Table now, we may note that Viewpoint is inversely related to a number of teacher behaviors underlying general structuring, and also inversely related to pupil gain in Flexibility. This relationship is inverse because the more teacher-centered teacher has the higher score on the Viewpoint scale. In the present instance the more pupil-centered teacher appears to have the advantage in increasing pupil flexibility; these increases in turn appear to be asssociated with structuring lessons to maintain pupil interest, adapting to individual differences, and varying materials and activities. In interpreting these particular results it appears that greater flexibility in teaching practice is linked to the greater increases in flexibility in pupil thinking.

Of the remaining variables dealt with in the study, Stability, a teacher characteristic, was not linked to either teacher classroom behaviors or pupil creativity. Similarly, Sensitivity to Problems, an aspect of pupil creativity, was not associated with any teacher characteristic, although it was negatively associated with two aspects of teacher behavior within the classroom climate dimension as may be observed in the fourth column at the bottom of Table 1.

Turning now to general interpretation of the results, it is very noticeable in the data that each teacher characteristic, particular sets of teacher behaviors, and pupil change on a particular creativity test tend to compartmentalize. This compartmentalization may most easily be seen by noting that there is little recurrence of the same teacher behavior across the columns at the top of Table 1. Observing the tendency of the present data to compartmentalize, and adding to it the knowledge that the teacher characteristics measured are uncorrelated, it seems that the typical teacher may be able to obtain changes in pupil creative behavior along one or perhaps two dimensions. Certainly it would be extremely rare to find a teacher who combined all of those uncorrelated characteristics and behaviors apparently needed to produce changes in pupil creative behavior along the four dimensions measured. When interpreted in light of the theory prevalent in the literature, that teaching behavior is very complex and teachers often practice inconsistent and conflicting roles in the classroom resulting in little gain on creativity measures, the findings of this study are more understandable. None the less, the present data suggests that we may know something about those teacher characteristics and behaviors linked to pupil growth in creativity and that by capitalizing on these characteristics and encouraging these behaviors we could obtain a more favorable climate for pupil growth in creativity than we now enjoy.

These characteristics and behaviors may be summarized as follows: (1) Imaginative or resourceful teachers appear to use positive motivation, to encourage unusual pupil responses, and to obtain improvements in pupil ability to give unusual uses for common objects; (2) Pupil-centered teachers appear to adapt to individual differences, to vary materials and activities, and to obtain improved flexibility in pupil thinking; (3) Highly organized teachers appear to obtain pupil interest and to have good pupil-teacher relationships, but they do appear to restrict pupil fluency of ideas.

TABLE 1

Characteristics

Observed Teacher behaviors — read down

Column 1 RESOURCEFULNESS	Column 2 ORGANIZATION	Column 3 VIEWPOINT	Column 4 INVOLVEMENT
1. Motivational Climate * (F=3.02)	1. Motivational Climate (F=3.81*)	1. Teacher Approach (F=3.19*inverse)	1. Encourages pupil Initiative (F=11.82*** inverse)
2. Encourages Unusual Responses** (F-4.58)	2. Pupil Interest (F=5.02**)	2. Adaptation to Individual Differences (F=4.26* inverse)	
3. Pupil-pupil relationship (F=3.02*)	3. Teacher-pupil Relationships F=9.61***)	3. Variation in Materials and Activities (F=6.88**inverse)	
		4. General Structuring Total (F=8.65***inverse)	
1. Redefinition (Unusual uses for common objects) (F=8.93***)	1. Fluency (having many ideas) (F=7.27**inverse)	1. Flexibility (other uses for common objects) (F=5.79**inverse)	1. Redefinition (F=3.94*)

Measured Changes in pupil behavior

3. Pupil-pupil (.38**)			3. Total Climate (-.39**)
2. Teacher-pupil Relationship (.37**)		2. Encourages pupil initiative (.35*)	2. Teacher-pupil Relationships (-.41**)
1. Motivational Climate (.36**)	1. Teacher-pupil Relationship (-.44**)	1. Teacher approach (.38**)	1. Pupil interest (-.47**)
REDEFINITION Column 1	FLUENCY Column 2	FLEXIBILITY Column 3	SENSITIVITY Column 4

Observed Teacher Behaviors — read up

Pupil Creativity Tests

*p< .10
**p< .05
***p< .01

Attachment 1

Observed Items of Teacher Behavior

CLIMATE

1. Motivational Climate - Assessed on a five point scale each five minute period; from continuous threatening or punitive motivational stimuli; (negative = 1) to continuous supportive, positively reinforcing stimuli (positive = 5) (r_{xx}=.75)
2. Pupil Interest - Assessed positive or negative once each 10 minute period; positive = pupil eagerness, attention, intent work etc.; negative = pupil reluctance, restlessness, irritability, etc. (r_{xx}=.76)
3. Teacher-pupil Relationship - Assessed positive or negative once each 10 minute period: positive = teacher responds positively, uses "we", is attentive to pupil remarks, asks opinion, etc.; negative = teacher abrupt with pupils, uses "I", cuts off pupil talk, interfered, involved few children. (r_{xx}=.65)
4. Pupil-pupil Relationship - Assessed positive or negative once each 10 minute period: positive = children refer positively to success of others, share responsibility, accept overt differences in capability, etc.; negative = children refer negatively to success of others, reluctant to share responsibility, make fun of others, etc. (r_{xx} = .60)

GENERAL STRUCTURING

1. Pupil Initiative - Assessed on a five point scale each five minute period from complete teacher domination (low pupil initiative = 1) to high pupil control (high pupil initiative = 5) (r_{xx}=.91)
2. Teacher Approach - Assessed positive or negative once each ten minute period; positive = teacher continuously builds pupil interest as lesson progresses, alters pace, has materials ready, concludes lesson while interest high;

negative = teacher fails to build interest, pace unvaried, materials not ready, children restless when lesson concludes (r_{xx}=.86)

3. Adaptation to Individual Differences - A tally is kept of the number of times a teacher differentiates for individuals and the number of different individuals with whom the teacher spent time. A score is obtained by dividing the number of different individuals by the total pupils present and multiplying by the number of times the teacher differentiates. This is then divided by the number of minutes observed to give a ratio relative to the time observed and the number of pupils present.
4. Variation in Materials and Activities - number of different materials and activities used during total observation (checked off of list of materials and activities.) (r_{xx}=.45)

SPECIFIC STRUCTURING

1. Encouragement of Pupil Divergent Thinking - Assessed on a five point scale each five minute period; from teacher allows only convergent thinking, giving the correct response = 1) to teacher's main purpose is to obtain divergent thinking = 5) (r_{xx}=.77)
2. Encouragement of Unusual Pupil Responses - One tally for each positive reinforcement of an unusual pupil response (r_{xx}=.72)